UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

refer to:
OSB1998-0962

June 29, 1998

W.B. Paynter
U.S. Army Corps of Engineers
Portland District, CENWP-CO-GP
P.O. Box 2946
Portland, Oregon 97208-2946

Re: Consultation on Applegate River Aggregate Excavation (COE 97-1590), Josephine County, Oregon

Dear Mr. Paynter:

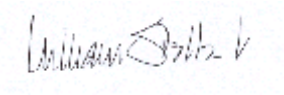
Enclosed is a biological opinion regarding the effects on Southern Oregon/Northern California coho salmon (SONC coho) and Southern Oregon/Coastal California chinook salmon (SOCC chinook) from issuance of a Section 404(b)(1) permit (COE 97-1590) to excavate aggregate from several gravel bars on the lower Applegate River. The permit applicant is Copeland Sand and Gravel (Copeland), which proposes to excavate about 88,000 cubic yards of aggregate in the summer of 1998.

SONC coho have been listed as threatened under the Endangered Species Act (ESA) by the National Marine Fisheries Service (NMFS) (May 6, 1997, 62 FR 42588). Critical habitat for SONC coho was proposed by the NMFS on November 25, 1997 (62 FR 62741). Southern Oregon/Coastal California (SOCC) chinook salmon were proposed for listing under the ESA on March 9, 1998 (63 FR 11482), with a final listing decision in March 1999; critical habitat for SOCC chinook was proposed at the same time as the proposed listing. Both SONC coho and SOCC chinook salmon occur in the Applegate River, which is a major tributary of the Rogue River, in southwestern Oregon and northern California. This consultation is undertaken under section 7(a)(2) of the ESA, and its implementing regulations, 50 CFR Part 402.

In a letter dated January 26, 1998, you requested formal consultation on Copeland's application. Attached to the letter was the Public Notice for Permit Application (dated January 21, 1998) which described the proposed action; the NMFS had previously received a copy of a detailed report (dated December 16, 1997) describing the proposed project, including a Biological Assessment and a hydraulic analysis. In a letter dated February 20, 1998, the U.S. Fish and Wildlife Service (USFWS) provided several recommendations for project modifications to the COE and Copeland's consultants. Discussions between the NMFS, USFWS, Copeland's consultant, and your staff led to revisions and additions to the proposed project, which were described in a May 1, 1998 letter from Copeland's consultant to the Portland District of the Corps of Engineers (COE). The COE transmitted the consultant's letter to the NMFS in a letter dated May 8, 1998. In a June 1, 1998 telephone conversation, Corps and NMFS staff agreed that conferencing on the effects of the action on SOCC chinook salmon was desirable (personal communication, Dan Kenney, NMFS with Bill Davis, COE).

Enclosed is the Biological Opinion on your issuance of a 404(b)(1) permit to Copeland, authorizing the incidental take of SONC coho that may be caused by this action, provided that the terms and conditions of the incidental take statement are met. If you have any questions regarding this opinion, please contact Dan Kenney, Fishery Biologist at (541) 957-3385.

Sincerely,



William Stelle, Jr.
Regional Administrator

Enclosure

cc: Mike McCabe, Oregon Division of State Lands, Salem
Mike Evenson, Oregon Department of Fish and Wildlife, Central Point
Steve Wille, U.S. Fish and Wildlife Service, Portland

Endangered Species Act - Section 7
Consultation

BIOLOGICAL OPINION

Effects of Aggregate Excavation (COE ID #97-1590) on Applegate River Gravel Bars on Southern Oregon/Northern California Coho Salmon and Southern Oregon/Coastal California Chinook Salmon

Agency: Portland District, U.S. Army Corps of Engineers

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Date Issued: June 29, 1998

Refer to: OSB1998-0962

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I. Background

The Southern Oregon/Northern California (SONC) coho salmon (*Oncorhynchus kisutch*) has been listed as threatened under the Endangered Species Act (ESA) by the National Marine Fisheries Service (NMFS) (May 6, 1997, 62 FR 42588). Critical habitat for SONC coho was proposed by the NMFS on November 25, 1997 (62 FR 62741). The Southern Oregon/Coastal California (SOCC) chinook salmon (*Oncorhynchus tshawytscha*) was proposed for listing under the ESA on March 9, 1998 (63 FR 11482), with a final listing decision in March 1999; critical habitat for the SOCC chinook was proposed at the same time as the proposed listing. Both SONC coho and SOCC chinook salmon occur in the Applegate River, which is a major tributary of the Rogue River, in southwestern Oregon and northern California.

In a letter dated January 26, 1998, the Portland District of the U.S. Army Corps of Engineers (COE) requested formal consultation on the effect of its issuance of a permit (COE ID #97-1590) to Copeland Sand and Gravel (Copeland) to excavate aggregate material from several gravel bars near Murphy, Josephine County, Oregon on SONC coho salmon. Copeland submitted the application under Section 404(b)(1) of the Clean Water Act, which the COE administers. Copeland proposes to remove, with heavy machinery, approximately 88,000 cubic yards (cy) of sand and gravel from three bars between river miles 16 and 18.5 of the Applegate River. The excavation would create several channels or alcoves on the bars, which are intended to provide rearing habitat for juvenile salmonids. Enhancements to the channels, such as plantings of riparian vegetation, and placement of large woody debris, are also proposed. The aggregate excavation is proposed for the summer of 1998. Attached to the COE's January 26, 1997 letter, was the Public Notice for Permit Application (dated January 21, 1998) which described the proposed action; the NMFS had previously received a copy of a detailed report (dated December 16, 1997) describing the proposed project, including a Biological Assessment (BA) and a hydraulic analysis.

In a letter dated February 20, 1998, the U.S. Fish and Wildlife Service (USFWS) provided several recommendations for project modifications to the COE and Copeland's consultants; NMFS staff discussed these proposed modifications with the USFWS and the consultants on March 3, 1998. On March 4 and 5, NMFS staff continued discussions with Copeland's consultants on the USFWS-proposed modification and on the details of a

monitoring plan. These discussions led to revisions and additions to the proposed project, which were described in a May 1, 1998 letter from Copeland's consultant to the COE. The COE transmitted the consultant's letter to the NMFS in a letter dated May 8, 1998. In a June 1, 1998 telephone conversation, Corps and NMFS staff agreed that conferencing on the effects of the action on SOCC chinook salmon was desirable (Personal communication, Dan Kenney, NMFS, with Bill Davis, COE).

The objective of this biological opinion is to determine whether the aggregate excavation and associated activities proposed by Copeland are likely to jeopardize the continued existence of SONC coho salmon, listed as threatened under the ESA, or of SOCC chinook salmon, proposed for listing as threatened under the ESA, or result in destruction or adverse modification of proposed critical habitat for these species. Although NMFS expects some effects to individual fish and their habitat from these actions, the effects to SONC coho and SOCC chinook essential habitat are expected to be minor or beneficial because of project design, and adverse effects to individual SONC coho or SOCC chinook are expected to be rare. As part of the action, water temperature and fish use in the channels will be monitored over a period of three to five years, as will the physical stability of the channels and establishment of vegetation. The monitoring reports should provide a basis on which to evaluate similar proposals in future years.

II. Proposed Action

The "proposed action" is issuance of an individual permit under Section 404(b)(1) of the Clean Water Act. The permit would allow Copeland to excavate approximately 88,000 cy of sand and gravel from three bars between river miles 16 and 18.5 of the Applegate River. The portions of the bars to be excavated are above the surface of the Applegate River during normal summer flow volume, becoming fully inundated during flow volumes with return intervals of about 2 to 10 years. The aggregate would be primarily excavated in the form of channels or alcoves, each up to 30 feet in width and 4 to 6 feet in depth; alcove lengths would vary from about 100 to over 1,300 feet. Some of the alcoves would be branched; all would connect with the Applegate River on the downstream ends of the bars. Gravel would also be excavated from the areas

between the alcoves, but the cobble armoring at the upper ends of the bars would remain undisturbed, and the elevation of the top of the alcove would remain at or above the level of the 2-year return flood stage.

Copeland proposes to excavate the aggregate between July 1 and September 15, 1998 with a rubber-wheeled excavator. The excavator and other heavy equipment used in the proposed activities would access the bars using two temporary bridges over the Applegate River. The bridges would each consist of a 14-foot wide by 50-foot long steel railroad car, supported with concrete monoliths, and accessed on each end by a 30-foot long ramp. The ramps would each be composed of about 150 cy of aggregate from an upland source. The bridges would be placed at a height of about 4 feet above the river banks, and no excavation of the river banks would occur. Both bridges and all temporary fill would be removed before September 15. Copeland would avoid excavation in vegetated areas of the bars, would not enter the water with heavy equipment, and would refuel the heavy equipment offsite. The alcoves would be excavated in phases in order to minimize sediment input to the main river; the downstream end of each channel would be connected to the Applegate River only after all the rest of the alcove has been excavated and the sediment in the channel has settled.

Copeland believes that the alcoves would provide off-channel rearing habitat for juvenile salmonids that is currently in short supply along the mainstem Applegate River. Hyporheic flow should enter the alcoves through the gravel that will be retained at the upstream ends of the bars. The alcoves would be constructed, when possible, close to existing woody vegetation, and where it is not already present, native woody vegetation, such as willow, would be planted along the edges of the alcoves. In addition, Copeland will place a minimum of 2 whole trees (with rootwads attached) into each 100 linear feet of alcove. The combination of overhead cover from riparian vegetation, low water velocity, and (possibly) lower water temperature than the main river may provide valuable summer rearing habitat, especially for SOCC chinook and Klamath Mountain Province (KMP) steelhead.

During the winter, Copeland believes that juvenile salmonids, primarily KMP steelhead and SONC coho, would use the alcoves to escape high water velocities in the Applegate River. Even after the bars would be overtopped at high flow levels,

Copeland's hydraulic evaluation predicts that water velocities in the alcoves would be lower than in other areas of the river channel. In addition, at the suggestion of the USFWS, Copeland proposes to protect two alcoves, one on each of the main bars, with a berm that may provide additional protection to juvenile salmonids at high flow levels.

The COE has imposed several conditions on the proposed permit, including ones intended to prevent toxic substances from entering the Applegate River, minimize damage to riparian vegetation, and prevent excess turbidity. In addition, Copeland has proposed to monitor the alcoves for five years after their construction. Full monitoring, lasting for three years after the excavation, including 1) continuous records of water temperature in the alcoves and in the river, 2) surveys of juvenile salmonid and other fish use by snorkeling, 3) transect measurements to determine whether and how the physical condition of the alcoves changes over time, and 4) transect measurements of planted vegetation, to ensure that the plantings are surviving and to document canopy cover over the alcoves. Copeland will also provide an annual summary report on the monitoring, and a final summary report six months after the last sampling period. Finally, based on the findings of the final summary report, Copeland will continue limited monitoring of critical alcove features for an additional two years, ending in a summary report at the end of the two year period. It is likely that the additional monitoring will focus on fish use, alcove physical integrity, and shading of the alcoves.

III. Biological Information and Critical Habitat

The listing status, biological information, and critical habitat elements for SONC coho and SOCC chinook salmon are described in Attachment 1. Some site-specific information is provided below.

The Applegate River is one of the principal tributaries of the Rogue River, and supports runs of SONC coho, SOCC chinook, and KMP steelhead. Flows and water temperatures in the upper part of the Applegate River are influenced by Applegate Dam, a Corps of Engineers flood control project. The effect of dam operations wanes in the lower portion of the river, as tributaries contribute to river flow (Personal communication, C.A. Fustish, Oregon Department of Fish and Wildlife [ODFW],

May 28, 1998). Summer water temperatures in the tributaries and most of the mainstem are higher than desired and are likely a limiting factor for all salmonid species in the Applegate basin (RVCOG 1997).

Compared to some other tributaries, the Applegate is not a major producer of coho salmon in the Rogue River basin (RVCOG 1997). Some production occurs annually in the system, chiefly in tributaries such as Slate, Cheney, and Williams Creeks and the Little Applegate River. A few coho also spawn in the mainstem of the Applegate River within about 10 miles downstream of Applegate Dam (Personal communication, C.A. Fustish, ODFW, May 28, 1998). The Applegate produces substantial numbers of both fall chinook salmon and winter steelhead, and a few summer steelhead. Fall chinook salmon spawn throughout the mainstem of the Applegate, as do winter steelhead, although this stock also spawns in tributaries. Summer steelhead are thought to be confined to a few tributary streams near the mouth of the Applegate (Personal communication, C.A. Fustish, ODFW, May 28, 1998).

Most or all juvenile anadromous salmonids spawned in the mainstem of the Applegate, and many of those produced in tributaries, are pushed downstream to the Rogue River by increasing water temperatures during the summer. This generally occurs by the end of June (Personal communication, C.A. Fustish, ODFW, May 28, 1998) In addition, little off-channel or complex rearing habitat for juvenile salmonids is available in either the mainstem or many of the tributaries during the remainder of the year (RVCOG 1997). Thus, the availability of juvenile rearing habitat is likely a limiting factor for anadromous salmonids in the Applegate system, especially for coho salmon and steelhead, which typically smoltify and outmigrate at age 1+ or greater.

Rogue River basin SONC coho smolts typically outmigrate from mid-April through mid-July, with a peak in June (ODFW 1991). Adult coho typically migrate into the Applegate beginning in October, and spawn mostly in November and December. SOCC chinook may be less affected by the availability of rearing habitat in the mainstem of the Applegate, because these fish usually outmigrate as subyearlings, entering the Pacific Ocean mostly in August through October (ODFW 1992). Adult fall chinook salmon typically enter the Rogue River between the middle of August and the middle of September, but the mean date of freshwater entry of fall chinook that later spawned in

the lower Applegate River between 1974 and 1978 was September 13 (ODFW 1992). SOCC chinook were observed spawning in the lower Applegate River between 1974 and 1985 from mid-October through early December (ODFW 1992).

Availability of appropriately-sized spawning substrate is not known to be a limiting factor for SOCC chinook in the mainstem of the Rogue below the confluence with the Applegate (Personal communication, T.D. Satterthwaite, ODFW, May 29, 1998).

IV. Evaluating Proposed Actions

The standards for determining jeopardy are set forth in Section 7(a)(2) of the ESA as defined by the consultation regulations (50 C.F.R. Part 402). Attachment 2 describes how NMFS applies the ESA jeopardy and destruction/adverse modification of critical habitat standards to consultations for Federal land management actions in the Rogue River basin.

As described in Attachment 2, the first steps in applying the ESA jeopardy standards are to define the biological requirements of listed or proposed species and to describe the species' current status as reflected by the environmental baseline. In the next steps, NMFS' jeopardy analysis often considers how proposed actions are expected to directly and indirectly affect specific environmental factors that define properly functioning aquatic habitat essential for the survival and recovery of the species. This type of analysis is set within the dual context of the species' biological requirements and the existing conditions under the environmental baseline (defined in Attachment 1). Such an analysis takes into consideration an overall picture of the beneficial and detrimental activities taking place within the action area. In this proposed action, however, NMFS has determined that potential effects of the action on environmental factors are a less likely cause of harm to the listed species than direct physical injury. If direct physical injury or mortality to individuals of these species or the net effect on the environmental baseline of the proposed activity is found to jeopardize the listed species, then NMFS must identify any reasonable and prudent alternatives to the proposed action.

A. Biological Requirements

For this consultation, NMFS finds that the biological requirements of SONC coho and SOCC chinook are best expressed in terms of current population status. This information is summarized in Attachment 1. As discussed in III., above, SONC coho and SONC chinook use the subject portion of the Applegate River as a migration corridor, as juvenile rearing, and as (chinook) spawning and incubation habitat. Therefore, the environmental factors that define properly functioning migration, rearing, spawning, and incubation habitat are necessary for survival and recovery of the species. Individual environmental factors include water quality, habitat access, physical habitat elements, channel condition, and hydrology. Although it is not relevant to this action, properly functioning watersheds, where all of the individual factors operate together to provide healthy aquatic ecosystems, are also necessary for the survival and recovery of the listed/proposed species. This information is also summarized in Attachment 1. As discussed in "V. Analysis of Effects", below, the NMFS does not expect that the aggregate excavation will substantially adversely affect any of the environmental factors or essential features of SONC coho and SOCC chinook habitat.

B. Environmental Baseline

Current range-wide status of SONC coho and SOCC chinook under environmental baseline. NMFS described the current population status of the SONC coho and SOCC chinook in their status reviews (Weitkamp et al. 1995; and Myers, et al. 1998, respectively), and in the SONC coho final rule (62 FR 24588) and the SOCC chinook proposed rule (63 FR 11482). Critical habitat for SONC coho was proposed by the NMFS on November 25, 1997 (62 FR 62741), while critical habitat for SOCC chinook was proposed simultaneously with the proposed listing. The recent range-wide status of this species is summarized in Attachment 1.

Current status of SONC coho and SOCC chinook under environmental baseline within the action area. The "action area" is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR 402.02). The general action area can be defined as the mainstem Applegate River downstream from just upstream of the uppermost excavation site

at river mile 18.5 to the mouth of the Rogue River at the Pacific Ocean.

As noted above, SONC coho and SOCC chinook use the action area as a migration corridor and, particularly for chinook, as a rearing, spawning and incubation area. Spawning by fall chinook salmon is known to occur in substantial portions of both the Applegate and Rogue rivers. High water temperatures likely make at least the Applegate River section of the action area unsuitable habitat for coho and chinook salmon during the mid- to late summer, but the proposed action would not likely affect water temperature in the Applegate and Rogue rivers. The constructed alcoves may sustain a different water temperature than the Applegate River, due to hyporheic flow, but the effect of this flow on the river should be negligible. Thus, while the environmental baseline of the Rogue River basin is dominated by conditions rated largely as “at risk” or “not properly functioning” (based on assessments from Federal land management agencies), the proposed action would not likely affect the relatively poor baseline conditions. These conditions are likely the result of agricultural development and upstream forest management practices.

Based on the best information available on the current status of SONC coho and SOCC chinook (Attachment 1), NMFS’ assumptions given the information available regarding population status, population trends, and genetics (see Attachment 2), and the relatively poor environmental baseline conditions within the action area (see the SONC coho final listing rule and SOCC chinook proposed listing rule), NMFS concludes that not all of the biological requirements of the species within the action area are currently being met under the environmental baseline. Actions that do not retard attainment of properly functioning aquatic conditions, when added to the environmental baseline, are necessary to meet the needs of the species for survival and recovery.

V. Analysis of Effects

A. Effects of Proposed Action

The effects determination in many Opinions is made using a method for evaluating current aquatic conditions (the environmental baseline) and predicting effects of actions on them. While the full process is not appropriate in the

current Opinion, because the subject action is unlikely to substantially adversely affect the environmental baseline, this process is described in the document "Making ESA Determinations of Effect for Individual or Grouped Actions at the Watershed Scale" (NMFS 1996). This assessment method was designed for the purpose of providing adequate information in a tabular form for NMFS to determine the effects of actions subject to consultation. The effects of actions are expressed in terms of the expected effect (restore, maintain, or degrade) on aquatic habitat factors in the project area.

The results of a completed checklist for a proposed action provides a basis for determining the overall effects on the environmental baseline in the action area. Effects to the environmental baseline from this action are expected to be insignificant (all aquatic habitat factors will be maintained) because of project design.

The principal potential effects of the proposed aggregate excavation to SONC coho and SOCC chinook and their critical habitat are related to the removal of approximately 88,000 cy of gravel, which may disturb SONC coho and SOCC chinook and their habitat principally by the construction of bridges to access the gravel bars, and excavation of gravel in proximity to the river. In addition, the possible introduction of toxic substances into the river, the loss of stream substrate, and possible future mortality within the alcoves also have the potential to adversely affect SONC coho, SOCC chinook, and their proposed critical habitat.

I. Bridge construction and excavation. These activities chiefly have the potential to indirectly affect SONC coho and SOCC chinook through impacts to habitat (including primary and secondary productivity), while some direct effects of these activities to individual salmon are also possible. Principally, these activities would create turbidity (suspended sediments) in the Applegate River from fine sediments in the materials that would be placed or excavated. Much of the suspended sediment would deposit in the Applegate River a short distance downstream of the bridge construction/excavation sites. In addition, the equipment used for these activities may come into direct contact with individual salmon.

Turbidity, at moderate levels, has the potential to adversely affect primary and secondary productivity, and at high levels,

has the potential to injure and kill adult and juvenile fish, and may also interfere with feeding (Spence et al. 1996). Newly emerged salmonid fry may be vulnerable to even moderate amounts of turbidity (Bjornn and Reiser 1991). Fine redeposited sediments also have the potential to adversely affect primary and secondary productivity (Spence et al. 1996), and to reduce incubation success (Bell 1991) and cover for juvenile salmonids (Bjornn and Reiser 1991).

Primary and secondary production would not likely be substantially affected by the proposed action because of the relatively small amount and short duration of turbidity produced by the bridge construction and gravel excavation. Similarly, effects of the fine deposited sediment should be minor. Little of the fill used to construct the ramps on the ends of the bridges should enter the water, because the concrete supports for the bridges would stand between the ramp fill and the river, and would prevent the fill from sloughing into the river during use of the bridges. The amount of turbidity produced by incidental spills of fill and/or aggregate during use of the bridge should also be minor and short-term. Because the source of deposited sediment would result from suspended sediment (turbidity), its effect should also be minor.

Excavation of gravel from the bars should not cause a substantial amount of turbidity or deposited sediments, because nearly all of the alcove excavation will occur without a direct connection to the Applegate River. Turbidity created in the alcoves would be allowed to dissipate before the connection between the alcove and the river is made. Thus, the effects of turbidity released to the river would be minor and short-term, as would the effects of deposited sediment.

Although turbidity has some potential to directly adversely affect fish, this usually occurs in situations where no relief from the turbidity is possible. In the Applegate River, any juvenile SONC coho and SOCC chinook present during the proposed activities would have the opportunity to move out of the minor and short-term turbidity plumes created by the proposed action, so no direct adverse effect is likely. Also, indirect effects of turbidity on juvenile salmon, such as a reduction in prey availability, seem unlikely due to the small scale of the action’s effect on benthic invertebrates. Deposited sediments should have a similar negligible effect on SONC coho, because no spawning of this species is likely to

occur in the lower Applegate River. Although SOCC chinook spawn in the lower Applegate River, the likely small scale and short duration of sediment deposition associated with the proposed actions would mean that effects on chinook spawning and incubation habitat should be negligible.

As noted above, high water temperatures are thought to prevent juvenile SONC coho and SOCC chinook salmon from inhabiting much of the lower Applegate River during the summer, and few, if any, adult SONC coho or SOCC chinook should be present in the Applegate River until October. It is likely, however, that at least a few juvenile salmon will be present in the lower Applegate River in early July, and a few adult SOCC chinook may be present in early September. Salmon present in the area of the excavation have the potential to be directly affected by Copeland's use of heavy equipment during bridge-building and excavation activities through capture, crushing or disturbance.

It is possible that individual juvenile SONC coho and SOCC chinook in close proximity to the "mouths" of the alcoves might, in the process of aggregate excavation, come in contact with the excavator when the bucket is closed and retrieved. Fish in the path of the bucket could be crushed by the movement of aggregate at the site, or captured within the bucket and dumped in a truck with the aggregate. Either of these scenarios would likely cause injury or death to the affected fish. Noise, light, vibration, etc. from Copeland's operation may also disturb migrating or rearing SONC coho or SOCC chinook, causing individuals to avoid the immediate excavation area. Finally, similar direct effects to other lower Applegate River organisms, such as benthic invertebrates and several species of fish, may occur due to contact with an excavator bucket.

While the possibility exists that direct physical harm could occur to SONC coho or SOCC chinook due to the use of Copeland's equipment, it seems likely that such injuries would be rare. This is because few salmon are likely to occur in the lower Applegate River during the proposed in-water work period, and the majority of these fish are both wary of potential danger and have substantial swimming ability (lower Applegate River sub-yearling coho and chinook would be a minimum of about 70 mm and 100 mm in length, respectively, by July [Personal communication, C.A. Fustish, ODFW, May 29,

1998]. That is, the noise, movement, etc. from Copeland's equipment are likely to be easily detectable by salmon from a sufficient distance to allow the fish to avoid the area of danger. While the noise, etc. generated by Copeland's operation has the potential to disturb fish in the river, the zone of significant disturbance would be small compared to the remainder of the lower Applegate River, and so should not adversely affect individuals of the species.

Less mobile forms of salmon, such as eggs and fry, should not occur in the lower Applegate River during the in-water work period, and would not be affected by the proposed action. Injury and mortality to benthic invertebrates, as well as eggs and larvae of other fish species, may occur because of the proposed activities, but based on reasoning similar to that advanced above for the indirect effects of turbidity and sedimentation, it is likely that the indirect effects on SONC coho and SOCC chinook would be minimal.

ii. Toxic contamination. Operation of the excavator, trucks, etc., requires the use of fuel, lubricants, etc., which, if spilled into the lower Applegate River, could injure or kill aquatic organisms. However, Copeland plans to perform all refueling of heavy equipment outside of the river channel. Also, the COE requires, as a condition of the proposed permit, that Copeland take care to prevent any petroleum products, chemicals, or other deleterious materials from entering the water. Assuming that Copeland meets these conditions, it is unlikely that a substantial spill will occur. Even if a spill of a toxic material were to occur, it is likely that the volume of flow in the lower Applegate River would quickly dilute the substance to a non-lethal level for SONC coho and SOCC chinook that might be in the vicinity.

iii. Loss of substrate. In addition to the obvious loss of potential in-stream substrate, extraction of aggregate from the floodplain of the lower Applegate River has the potential to change the hydraulic attributes of the river at high flow and the future configuration of the river channel. Because the type and amount of substrate in the wetted channel, as well as the hydraulic attributes of the channel are components of the physical environment in which SONC coho and SOCC chinook exist, it is possible that the loss of aggregate in the lower Applegate and Rogue rivers may affect these species.

The most common fisheries concern related to aggregate mining from stream channels is loss of spawning habitat. In addition, as noted above, interstices between large substrate particles can provide cover for juvenile salmonids. In many streams, large substrate (chiefly boulders and cobble) provides stream bottom roughness, forming areas of hydraulic shelter for adult and juvenile salmonids. Substrate of all sizes provides habitat for benthic organisms, which are a major part of the Rogue River basin food web.

The lower Applegate River is a gravel-rich area, so it is unlikely that the excavation and removal of 88,000 cy of aggregate would adversely affect the quantity of stream substrate for the purposes of spawning, shelter, etc. As noted above, abundance of spawning habit in the Rogue River below the Applegate River is not thought to be a limiting factor for SOCC chinook salmon, and SONC coho spawn in tributary streams. The larger substrate particles (cobble and boulders) used by salmonids for shelter are unlikely to be a substantial portion of the aggregate removed by Copeland, as nearly all of the excavation will be above the two-year flood return interval elevation, where, because of hydraulic forces, smaller-sized particles are likely to be dominant.

The proposed aggregate excavation would occur on several gravel bars and out of the normal wetted channel. Except for the alcoves, aggregate would be removed only to the elevation of the 2-year return interval flood. At higher flow levels, however, the excavation areas will become a part of the wetted channel, and subject to hydraulic forces. An hydraulic analysis of the effects of the excavation (commissioned by Copeland and included with the BA) determined that the proposed action would, during higher flow events, reduce mean cross-sectional water depth at the site and for a distance upstream. The analysis also stated that the proposed excavation would reduce water velocity along the margins of the channel at the site during the same high flow events. Thus, the proposed excavation would likely alter the channel shaping forces at and slightly above the site. In addition, the construction of the alcoves, the placement of large woody debris in the alcoves, and the establishment of woody riparian vegetation along the alcoves also have the potential to affect high-flow hydraulics and resultant channel morphology. The long-term effects of the action on channel morphology, and, therefore, SONC coho and SOCC chinook, are speculative. It seems likely, however, that other factors, such as water

temperature and upstream agricultural and silvicultural practices, will have a substantially greater effect on these species than channel morphology at this site.

iv. Mortality to alcove inhabitants. After the aggregate excavation is completed at the site, alcoves with relatively low water velocity, large woody debris, and riparian vegetation plantings will remain. Water temperature in the alcoves may be lower in the summer and higher in the winter than in the adjacent and connected Applegate River, due to hyporheic flow, and, eventually, to the riparian plantings. The conditions created in the alcoves, during at least a portion of the year, are likely to be favorable to many of the species and/or lifestages of fish present in the river, including juvenile anadromous salmonids. Thus, the physical characteristics of the alcoves are likely to attract fish from the Applegate River during periods when conditions in the river are less hospitable than in the alcoves, potentially providing survival benefits.

While survival benefits to anadromous salmonids, including SONC coho and SOCC chinook, are possible, several sources of potential adverse effect to alcove inhabitants also exist. The most likely forms of adverse effects to juvenile salmon in alcoves include predation, temperature intolerance, and stranding. Of course, all of these adverse effects also can occur in the Applegate River.

Predation. Juvenile salmonids are most prominently preyed upon by other fish and by birds. Exotic predaceous fish such as largemouth and smallmouth bass, and Umpqua squawfish, as well as larger native salmonids, are likely to find suitable living conditions in the alcoves. Similarly, piscivorous birds such as herons and kingfishers are also likely to fish in the alcoves. While both predaceous fish and birds would undoubtedly pursue juvenile salmon in the alcoves, it is impossible to say whether their concentration or success rate would be higher in the alcoves or in the mainstem Applegate or Rogue rivers. The shelter for juvenile salmonids provided by the large woody debris may lessen predator success rates, and the riparian plantings may eventually provide some level of protection from avian predators. Over-hanging riparian vegetation and large woody debris are not common components of the mainstem Applegate, so their presence in the alcoves is likely of benefit, but the long-term effect of the alcoves on

predation on SONC coho and SOCC chinook is entirely speculative.

Temperature. While it is likely that hyporheic flow would compose the majority of the flow in the alcoves, and that the alcoves will thus be cooler than the mainstem of the Applegate River during the summer and early fall, the absolute water temperatures that would occur in the alcoves are currently unknown. Thus, it is possible that water temperatures in the alcoves may rise above the preferred (and lethal) levels for juvenile salmonids, even if the water in the alcoves is cooler than the river water. In this scenario, while juvenile coho and chinook salmon in the river might outmigrate to the Rogue River as the water temperature rises, fish may remain in the cooler alcoves. If the water temperature in the alcoves eventually rises to the point where these fish attempt to outmigrate, the temperature in the river may prevent successful outmigration.

The upper lethal temperature for coho and chinook salmon has been measured in the laboratory at about 26 to 29° C, but the preferred temperature range for these species is about 12 to 14° C (Bjornn and Reiser 1991). Water temperatures measured at the U.S. Geological Survey's Wilderville gage (about 10 miles downstream from the proposed aggregate excavation site) were highest during July and August of both 1996 and 1997 (COE 1998). In 1996, water temperature at the Wilderville gage peaked at about 27° C on several days in July. In 1997, peak temperatures at the gage were about 24° C on a few days in August. Throughout July and August of these years however, the hourly temperature varied through the day, with the highest daily water temperatures generally recorded at 1700 or 1800 hours and lowest temperatures at 0800 or 0900. Typically, during these months, the daily range in water temperature was around 4 to 6 C°.

Assuming that the water temperature characteristics of the Applegate River at the proposed project site are similar to those at the Wilderville gage, near-lethal peak temperatures are likely to occur at the site during many or most days in July and August. This assumption is consistent with ODFW's conclusion that few juvenile salmonids summer in the lower Applegate. Mabbott (1982, in Bjornn and Reiser 1991) found that young salmon and trout moved out of rivers in Idaho (where summer maximum temperatures were 24-26° C) to cooler areas even when summer minimum temperatures were 15-16°C. On

the other hand, Bjornn (1978, in Bjornn and Reiser 1991) found that juvenile chinook salmon and steelhead maintained high densities and grew normally in a stream with brief maximum daily temperatures up to 24°C, but where daily minimum temperatures were in the 8 to 12° C range. It would seem that juvenile salmon in a river with high daily maximum temperatures are likely to migrate to cooler areas, unless the daily minimum (and, presumably, mean) water temperatures are considerably lower than the maximum.

Unless the water temperatures in the alcoves are substantially (probably at least a 5C° lower daily maximum, or a >10 C° daily minimum) lower than in the river, it seems unlikely that any juvenile coho or chinook salmon will choose to rear in an alcove through a typical summer, although the lower water temperatures may increase the length of summer residence at the site, compared to the adjacent river. Based on the same data, it also seems unlikely that juvenile salmon would become thermally trapped in the alcoves. Based on the Wilderville gage date, even at apparently lethal maximum daily river temperatures (e.g., 27.03° C on July 25, 1996 at 1800), water temperatures drops out of the lethal range within a few hours (to 22.3°C by 0800 the next day)(COE 1998). The relatively orderly progression of daily maximum temperatures in the river over the summer, combined with the daily water temperature cycle, should provide juvenile SONC coho and SOCC chinook salmon the impetus and means to exit the alcoves, and safely outmigrate to the Rogue River.

Stranding. Rapid fluctuation of river elevation sometimes strands aquatic creatures on dewatered flats or in diminishing pools. Also, the gradual decrease in depth of a water body can leave its inhabitants with nowhere to go. The specifications of the proposed alcoves should prevent juvenile SONC coho and SOCC chinook from suffering this fate, at least in the alcoves. Copeland has proposed to excavate the sides of the alcoves at a 1:2 slope, so there should be no opportunity for shoreline stranding. In addition, Copeland will be required to excavate the alcoves so that the bottom elevation remains level or decreases from the end of the alcove to its outlet at the river. Copeland will also be required to maintain the alcove outlet at its construction depth. These two measures should prevent juvenile salmonids from being stranded in the alcoves, should the water elevation drop at low river discharge.

B. Effects of Interrelated and Interdependent Actions. Interrelated and interdependent actions are those that would not occur but for the proposed action. Copeland sells the aggregate it excavates chiefly for use in construction of buildings, roads, etc. There are many companies in southwest Oregon that sell rock for construction purposes; the aggregate is mined from streams or upland deposits, or is blasted from quarries and crushed. Therefore, although it is possible that some of the aggregate excavated by Copeland from the lower Applegate River would be used in construction projects that might adversely affect SONC coho or SOCC chinook, aggregate from other sources would be available whether the 404(b)(1) permit is issued or not. Thus, the proposed action will not result in actions that would not otherwise occur.

C. Cumulative Effects. Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." The “action area” for this consultation is the lower Applegate River downstream from river mile 18.5 and the Rogue River below the Applegate River confluence. Future Federal actions, including land management activities, are being (or have been) reviewed through separate section 7 consultation processes. In addition, non-Federal actions that require authorization under section 10 of the ESA will be evaluated in section 7 consultations. Therefore, these actions are not considered cumulative to the proposed action. NMFS is not aware of any future new (or changes to existing) State and private activities within the action area that would cause greater impacts to listed species than presently occurs. NMFS assumes that future private and State actions will continue at similar intensities as in recent years.

VI. Conclusion

NMFS has determined that, based on the available information, permitting of Copeland’s proposed aggregate excavation from the lower Applegate River under Section 404(b)(1) of the Clean Water Act, is not likely to jeopardize the continued existence of SONC coho, SOCC chinook, or result in the destruction or adverse modification of proposed critical habitat for either species. NMFS used the best available scientific and commercial data to apply its jeopardy analysis (described in

Attachment 2), when analyzing the effects of the proposed action on the biological requirements of the species relative to the environmental baseline (described in Attachment 1), together with cumulative effects.

In reaching this conclusion, NMFS determined that the survival and recovery of SONC coho and SOCC chinook would not be appreciably diminished by the proposed action. This conclusion was reached primarily because: 1) the proposed action would likely cause minor, short-term decreases in water quality, but the effects on the essential features of salmon habitat are expected to be negligible; 2) while individual juvenile salmonids within the alcoves may suffer injury or mortality, the rate of occurrence of adverse effects is expected to be lower or of the same magnitude as that of individuals in the Applegate River, 3) long-term effects to salmon habitat due to the loss of the aggregate from the channel are expected to be minor, due to the abundance of suitable substrate for spawning and cover, and to the many factors involved in changes in channel morphology, 4) direct disturbance of SONC coho and SOCC chinook due to noise, etc. would be minimal, due to the location of the majority of the excavation out of the wetted channel, and the small area of the aggregate excavation operation compared to the remainder of the lower Applegate River; and 5) direct mortality from entrainment in the excavator bucket, etc. should be rare because most individual coho and chinook salmon coming into proximity of the dredge should be aware and agile enough to avoid injury.

In the long-term, the presence and use of the alcoves may enhance survival for SONC coho and SOCC chinook. In addition, the information on fish use, water temperatures, riparian plantings, and alcove persistence developed through Copeland's monitoring plan will allow an assessment of the effects of the "alcove creation" aggregate excavation method on SONC coho and SOCC chinook.

VII. Reinitiation of Consultation

Based on the information provided, NMFS anticipates that an unquantifiable amount of incidental take could occur as a result of the actions covered by this Biological Opinion. To ensure protection for a species assigned an unquantifiable level of take, reinitiation of consultation is required: (1) if any action is modified in a way that causes an effect on

the listed species that was not previously considered in the information provided and this Biological Opinion; (2) new information or project monitoring reveals effects of the action that may affect the listed species in a way not previously considered; or (3) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR 402.16).

VIII. References

Section 7(a)(2) of the ESA requires biological opinions to be based on "the best scientific and commercial data available." This section identifies the data used in developing this opinion, in addition to the BA.

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IX. Incidental Take Statement

Sections 4(d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and

section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

A. Amount or Extent of the Take

The NMFS anticipates that the action covered by this Biological Opinion (permitting of excavation of aggregate from channel of the lower Applegate River) has more than a negligible likelihood of resulting in incidental take of SONC coho and SOCC chinook because of the potential for direct incidental take during in-water work, and because the alcoves created have some potential for causing mortality to juvenile salmonids. Effects of actions such as these are largely unquantifiable in the short term, and are not expected to be measurable as long-term effects on the species' habitat or population levels. Therefore, even though NMFS expects some low level incidental take to occur due to the actions covered by this Biological Opinion, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take to the species itself. In instances such as these, the NMFS designates the expected level of take as "unquantifiable." Based on the information provided, NMFS anticipates that an unquantifiable amount of incidental take could occur as a result of the actions covered by this Biological Opinion.

B. Reasonable and Prudent Measures

The NMFS believes that the following reasonable and prudent measure is necessary and appropriate to minimize the take of SONC coho and SOCC chinook .

1. The COE shall ensure that Copeland shall minimize the potential for direct incidental take of SONC coho and SOCC chinook due to the effects of aggregate excavation.

C. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the COE must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are non-discretionary.

1a. All general and specific conditions placed on the 404(b)(1) permit by the COE will be implemented by Copeland. These include standard conditions such as minimization of pollution, erosion, and turbidity, and definition of an in-water work window. In addition, actions proposed by Copeland in its consultant's May 1, 1998 letter shall be included as conditions of the 404(b)(1) permit, and shall be implemented by Copeland. These include the construction of berms around two of the alcoves, the placement of two whole trees (with rootwads attached) in each 100 linear feet of alcove, the preparation and implementation of a planting plan, and the implementation of the monitoring program described in Section II of the Biological Opinion for this action.

1b. Any injury or mortality to salmonids observed by Copeland as a result of its aggregate operation in the Applegate River shall be reported to the NMFS' Roseburg Field Office within 7 days. In addition, Copeland shall freeze or preserve (in 70% isopropyl alcohol) the carcasses of any salmonids killed and discovered during the excavation to allow species identification by the Roseburg Field Office. Close-up photos of salmonid carcasses that permit species identification may be substituted for the frozen or preserved carcasses.

1c. The aggregate excavation alcoves shall be constructed so that fish within the alcoves are not trapped by dropping water levels, and shall be maintained by Copeland, for the duration of the monitoring program, to ensure that access from the alcoves to the river is maintained at all flow volumes. In addition, if, during the duration of the monitoring program, it becomes apparent that the existence of the alcoves is a net detriment to the SONC coho, SOCC chinook, or any other ESA-listed anadromous salmonid Evolutionarily Significant Unit (ESU), Copeland

shall propose and implement NMFS-approved measures to address the adverse effect(s).

1d. Based on the final results of the monitoring program and as a part of the final monitoring report, Copeland will propose and implement NMFS-approved measures that are necessary to ensure that the alcoves do not trap fish due to future entrance shallowing. In addition, on the same basis, Copeland will propose and implement NMFS-approved measures that are necessary to ensure that the future existence of the alcoves will not cause a net detrimental effect to SONC coho, SOCC chinook, or any other ESA-listed anadromous salmonid ESU.